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Public Relations of the Minerals Industries

A Thesis submitted in partial fulfillment of the requirements for the degree of Master of Science.

by

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ABSTRACT

The minerals industries have encountered problems that go beyond the traditional production challenges. Adverse legislation and lack of public support have caused alarm to those in the industries. Many persons foresee a minerals crisis, and these crisis problems only add to the impending predicament. The mineral producers have started several public relations programs to avert the consequences of these actions. The minerals industries have been questioned on their approach to human values and must respond on a similar level to establish effective communications. An assessment of the value of the minerals industries in human terms instead of economic terms is necessary. The Quality of Life Concepts established by the U. S. Environmental Protection Agency give the needed perspectives to respond to these challenges, on all levels.

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INTRODUCTION

The mineral industries are confronted by problems that go beyond the traditional production challenges. The reputation of mining industries as good corporate citizens has been questioned. The United States Secretary of Interior, Cecil Andrus, has called the industries a group that would "rape, ruin, and run."[2] Non-mining advocates have attacked the use of public lands for mineral production. They have pointed out that miners are receiving free land, free minerals, and demand no restrictions.

Criticism has resulted in adverse legislation on state and federal levels. The mining advocates have responded with statements as, "Without mining, we will return to the stone ages," and, "These new laws will make it impossible to continue to produce minerals that are the lifeblood of our industrial civilization."

Mr. Gilbert E. Dwyer, Vice President-Administration, Kennecott Copper Corporation, has called recent adverse legislative actions, "A Mine Disaster on the Potomac." He says,

> For a long time the mining industry did pretty well in Washington. The industry had low visibility and its reputation scarcely came into play. We had powerful friends and few enemies in Congress.
>
> Public alarm over pollution, surface mining, and mine accidents has changed all that. And while mining has become highly visible, political power has shifted. The Supreme Court's one-man-one-vote decision in 1963 transferred political influence from rural to urban areas, where the majority of Americans live. The power is no longer held by men who understand mining and its problems.[5]

The laws are made by people who do not understand mining and its problems. The effects of adverse legislation, land withdrawals, and

environmental regulation are legal limits that make the region of operation smaller than before, as shown in the following graph.

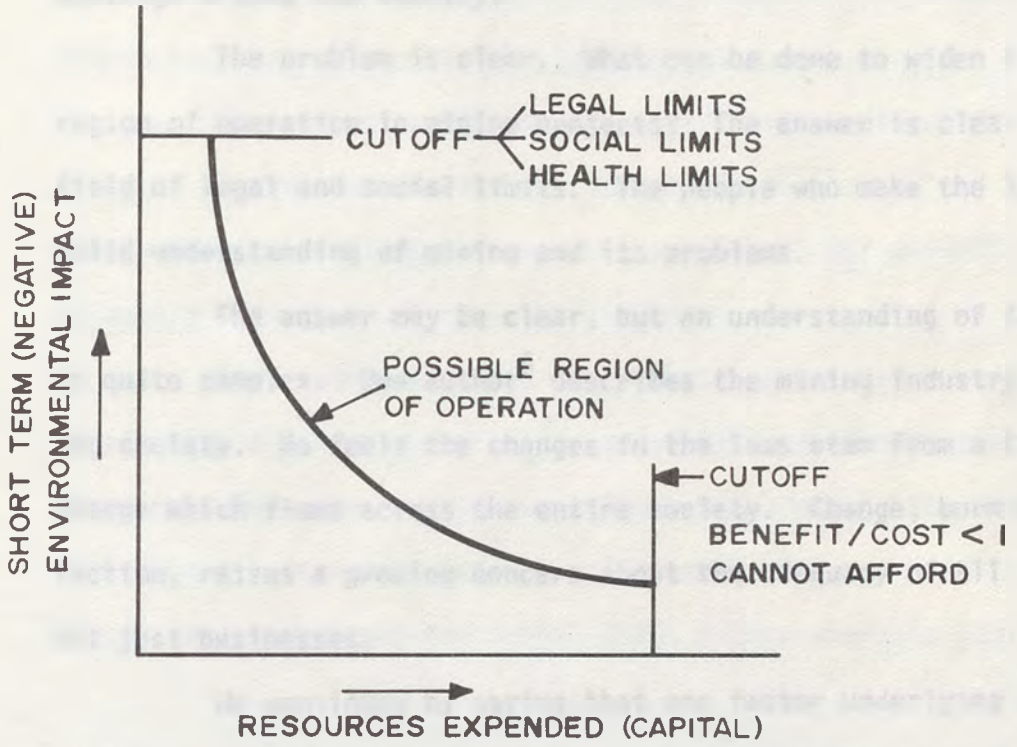

FIGURE 1 RELATIONSHIPS BETWEEN RESOURCE EXPENDITURE AND INTENSITY OF SHORT RANGE ENVIRONMENTAL IMPACT (AFTER FOSTER, 1974)[8]

Each mining operation, and the industry in general, has a curve of feasibility. The possible region of operation is determined by the cutoffs on either end of the curve. The adverse legislation shortens the operating region from both ends. The legal limits bring the cutoff closer to the zero point on the impact axis and the costs of compliance for the regulations bring the cutoff on the economic axis closer toward zero.

A concern has arisen among mining people as the possible region of operation has narrowed. Predictions of mineral shortages, mineral crises, and feelings of urgency have been apparent at mining meetings around the country.

The problem is clear. What can be done to widen the possible region of operation in mining projects? The answer is clear--in the field of legal and social limits. The people who make the laws need a solid understanding of mining and its problems.

The answer may be clear, but an understanding of the situation is quite complex. One author[6] describes the mining industry in a changing society. He feels the changes in the laws stem from a tide of change which flows across the entire society. Change, born of dissatisfaction, raises a growing concern about the adequacy of all institutions, not just businesses.

He continues by saying that one factor underlying the momentum of change was the searing experience of the Vietnam war. It caused doubts about national moral purposes, and challenged the credibility of the entire system.

The industries need to understand the complexities to develop a reasonable answer to the problem of enlarging the possible region of operation. Several public relations programs have been initiated by organizations of mining and mineral producers (Appendix C). The common theme has centered on the accumulation of goods and wealth. The concepts of "changing tide" and "shift of focus" are rarely seen.

Public relations implies a two-way communication. The current programs are not directed toward many of the people who are making the laws. Most of the efforts to relate to government are directed at an

aging, dwindling group of conservative men. The industry could be far more effective if more time and effort were spent impressing the importance of mining on the growing majority of liberal, populist, humanist members of Congress. They in turn could relate these ideas to the people back home who sent them to Washington.

The current programs surely will not be effective with this new group of congressmen who reflect this "tide of change." A general philosophy that reflects a measure or a "yardstick" for guidelines is necessary.

This author proposes the industry adopt the Quality of Life Concepts as a standard for policy and implementation of public relations programs. The concepts are summarized in a study by the United States Environmental Protection Agency entitled "Quality of Life Indicators in United States Metropolitan Areas, 1970, A Comprehensive Assessment."[10]

PUBLIC RELATIONS

What is public relations?

Scott Cutlip and Allen Center[4] define public relations as, "...the planned effort to influence opinion and action through socially responsible performance based on mutually satisfactory two-way communication."

James W. Anderson[1] calls public relations, "The Art of Reputation Management."

The mining industries find their perceptions of public support at an all-time low. An Engineering Education Panel Discussion[9] generated some comparison figures for business in general, including mining, in 1972.

- 1966, 70% of Americans thought business was striking a fair balance between profit and providing a service.
- 1972, 29% thought balance was fair.
- 1966, 55% had confidence in big companies.
- 1972, 27% had confidence in big companies.
- 1966, 28% thought big business was actually dangerous to our way of life.
- 1972, 50% felt the danger.

At a time when perceptions of business are at an historic low mark, perceptions of mining are at the very bottom of that range.

In 1972, only 6% report favorable impressions of mining compared with:

- 59% for food and grocery industry,
- 47% for automotive,
- 41% for airlines.

The minerals industries are enjoying a poor reputation for a job they feel is one of the bases of American life. They want the general public to know what they have been providing and what the provisions mean to people on a personal level. In the simplist of words, the minerals industries want recognition for a job well done.

CURRENT PROGRAMS

American Mining Congress Communications Program[11]

Public relations provides a socially responsible and effective means for mining industries to present their views to lawmakers and to the public. The most active endeavor is sponsored by the American Mining Congress and is called the AMC Communications Program. The AMC program asks the question, "Will the mining industry still be in action 20 years from now?"

The program was developed to overcome a number of problems that have been troubling the industry. For some time, AMC has recognized the existence of three notably difficult areas, outlined by J. H. Murphy at the 1976 Mining Convention. They are:

1. An information gap created by influx of new lawmakers. Because of the large numbers of quite new members in the U. S. Congress and the vast numbers of changes in personnel which have taken place in the senior policy-making levels of the executive branch, there is a serious information gap as to the nature of the U. S. mining industry and what mining means to this country in terms of its economic well-being and security posture. Further, AMC perceives widespread lack of understanding by the general public at the precinct levels within the states as to how the mining industry is endeavoring to supply the

nation's mineral requirements, while at the same time helping to achieve national environmental goals.

2. A serious lateral communications problem within the industry. An effective information program developed and used by a company or an association in one state or mining district could be adapted to other areas if it were circulated to others in mining.

3. Severe budget restraints. Though several boards of directors of mining industries have suggested communications programs, they have not taken into consideration the high cost of instituting such programs to solve the problems mentioned above.

With these three considerations in mind, an ad hoc meeting of some of the most experienced communications specialists of member companies was held. It and subsequent meetings resulted in a suggested AMC program. The views and recommendations of the study group were:[11]

1. That every mining man in the United States wants his operation to be sufficiently profitable to attract the capital needed to replace and renew his mines and equipment. He hopes unnecessary and unwise governmental regulations will not hamstring his efforts to continue supplying this nation with the minerals, fuels, and fertilizers its existence requires.

2. That mining companies have discovered that their existence depends on their ability to convince people that the mined materials our society requires must be produced with recognition of our environmental responsibilities.

3. That the American Mining Congress serves all segments of this complex industry. On its behalf, AMC meets and deals with pressures from governmental and public sources, making AMC the logical coordinator of the badly needed counter effort.

4. That such an effort must begin in the all-important local mining areas. In these areas, the proper approach can be developed and funded by local operators. Thus, it can be as extensive as local operators find necessary or can afford.

5. That AMC can stimulate such local operators, plus others equally concerned with mining's future, to begin similar activities within their reach.

6. That to assist these newcomers and those with public information programs already in operation, AMC could gather and make available copies of selected advertisements and booklets, or titles of available films, or broadcast materials--all telling the mining story. Depending upon decisions by local mining operators, such materials might be used or adapted to meet local needs.

The study group felt that to add this service to its legislative and safety programs would require AMC to employ a communications professional on its Washington staff. He (or she) should:

First--inventory public information activities in behalf of mining conducted by mining operators, state or regional mining associations, professional groups, or mining suppliers. This would establish what is being done now (and where) to inform the public.

Second--in a practical manner, the communications professional and communications committee should make both results and contents of the communications inventory available to industry members, suppliers and any others interested in developing a favorable public reception for mining. This makes good and workable ideas available to everyone.

Third--contact should be made with mining firms, state and other mining associations, and mining suppliers in areas where there are no public information activities being conducted in behalf of mining to urge them to establish such programs. Materials such as advertisements, booklets, films, etc., available through AMC would make it relatively easy and inexpensive to begin such an activity.

Fourth--the communications professional should work with AMC officers and the communications committee to formulate policies and approaches for improving the industry's public acceptance.

Fifth--the communications professional should work with a steering committee appointed by AMC officers and board, which would function as an arm of the communications committee. The steering committee would provide prompt response to urgent matters requiring action by the communications committee. The communications professional would be in frequent and regular contact with the steering committee, keeping it informed on matters affecting progress of the AMC communications effort.

In drawing up these proposals, the study group also hammered out the program's expected results, notably:

1. An expanded effort to supply the public with the facts about mining.
2. Greater involvement by a greater number of mining firms in this important responsibility, assisted by their supplier partners.
3. Increased efforts in informing the public at the significant "grass-roots" level, by first bringing about a detailed understanding of the nature of the industry's case by the mining community before taking it to the country, and thereby broadening our base of effective advocacy.

The program is intended purely as a source of information and assistance, so as to improve the industry's communications generally, and above all to win a better reputation for mining.

"The industry can never have enough good communications but rest assured that in developing the AMC Communications Program we are not trying to reinvent the wheel. We are simply trying to make it stronger."[11]

The AMC Communications Program was launched in August of 1976. A bulletin, Communications Exchange, has been published monthly since January 1977. It relays ideas and details of different

communications programs being used or developed in the mining and related resources industries. It is coordinated by:

Jim Murphy
Director of Communications Activities
American Mining Congress
1100 Ring Building
Washington, D. C. 20036

Telephone: (202)331-8900.

The Western States' Mining Public Relations Workshop[16]

The Western States' Mining Public Relations Workshop was initiated in May, 1975 under the sponsorship of the Idaho Mining Association. The purpose of the next workshop, 1976, hosted by the Colorado Mining Association, was to stimulate the interchange of public relations ideas and practices between the mining associations in the western states and their members. With this purpose in mind, the sessions were designed to better equip the mining public relations person, whether novice or professional, to deal with the current issues before the industry. The workshops dealt with a variety of subjects that are of interest to those involved in any phase of the mining business. The session chairmen have called on individuals with expertise in the subject matter to share their knowledge and insight with the participants. The program covers several aspects of public relations in detail, including:

1. Association Activity Update
2. Advertising and Image Building
3. Public Relations and Politics
4. Public Relations and National Issues

5. Public Relations and the Media

6. Media Roundtable.

The Anaconda "Grass Roots Politics and Public Action Committees"[7]

The Anaconda Company has developed a public relations program described by Howard L. Edwards, Vice President-Public Affairs. His presentation is "Grass Roots Politics and Public Action Committees." The program is called the "Anaconda Concerned Citizens Program"; the objectives are:

- to establish an effective means of communicating the role and needs of business to legislators and government agencies;
- to encourage employees to contribute time and money to support parties, candidates and issues of their choice;
- to interest employees in good government.

A series of posters, brochures, and plant visits are incorporated in the overall plan. The company also encourages its plant managers to become active locally, working with state and city officials, schools, and community groups.

Other Programs

Many of the state mining associations have developed and are maintaining their own public relations programs. (See Appendix C for complete list.)

DISCUSSION

An effective public relations program will be the result of careful planning and following a generally accepted practice. Some communication guidelines are laid out in a checklist for effective communications, from University of Nevada - Reno.[13]

1. Credibility. Communications starts with a climate of belief. This is built by performance on the part of the source. The performance reflects an earnest desire to serve the receiver. The receiver must have confidence in the sender. He must have a high regard for the source's competence on the subject.

2. Context. A communicatons program must square with the realities of its environment. Mechanical media are only supplementary to the word and deed that takes place in daily living. The context must provide for participation and playback. The context must confirm, not contradict, the message.

3. Content. The message must have meaning for the receiver and it must be compatible with his value system. It must have relevance to him. In general, people select those items of information which promise them greatest rewards. The content determines the audience.

4. Clarity. The message must put its point in simple terms. Words must mean the same thing to the receiver as they do to the sender. Complex issues must be compressed into themes, slogans, or stereotypes which have simplicity and clarity. The farther a message has to travel, the simpler it must be. An institution must speak with one voice, not many voices.

5. Continuity and Consistence. Communication is an unending process. It requires repetition to achieve penetration. Repetition--with variation--contributes to both factual and attitude learning. The story must be consistent.

6. Channels. Established channels of communication should be used--channels which the receiver uses and respects. Creating new ones is difficult. Different channels have different effects and serve in different stages of the diffusion process.

7. Capability of Audience. Communication must take into account the capability of the audience. Communications are most effective when they require the least effort on

the part of the recipient. This includes factors of availability, habit, reading ability, and receiver's knowledge.

The rated effectiveness of a program can be measured by a public relations rating score (Table 1, page 14). A continuing evaluation program helps maintain goals and completeness.

Quality of Life Values

"The Quality of Life Concept--A Potential New Tool for Decision Makers," published by the Environmental Protection Agency,[15] gives lists of human values by which the effectiveness of "messages" can be measured. The message is effective if it relates directly to the "public" intended.

1. The American Public

- There is growing cynicism and distrust of the government.
- Optimism about the future is declining.
- Cultural and political views are becoming uncoupled.
- A better standard of living remains at the top of the "personal hopes" list.
- Owning a house is still the number one goal of Americans.
- Vacation/travel come next among the priorities of Americans.
- It would not take much additional money to make most people happy.
  - $10/week for 10% of the population
  - $10-30/week for nearly 40% of the population
  - $30-50/week for nearly 30% of the population
  - $50 or more/week for nearly 20% of the population.

Table 1. PUBLIC RELATIONS RATING SCORE

(after Conover, 1964)[3]

Value		Accomplished	Not Accomplished
	RESEARCH		
10	1. Establish and maintain a fact file		
5	2. Determine public affected		
10	3. Determine attitudes of public affected		
	PLANNING		
5	1. Set long-term goals		
5	2. Set short-term goals		
5	3. Make a timetable		
5	4. Determine course of action to achieve goals		
5	5. Make a "master" plan		
	COMMUNICATION		
5	1. Adequate coverage of public		
5	2. Provisions for two-way communication		
10	3. Adequate score on communications checklist		
	EVALUATION		
10	1. Program pre-tested and revised if necessary		
10	2. Goals achieved		
5	3. Program cost offset by results		
5	4. Usable report of program completed for future use and reference		
100	TOTALS	+	-
	PROJECT SCORE (+ total less - total)		

- Peace in the world remains a hope that more and more have.

- New fears, developed only since the 1960's, are of inflation and drugs and pollution.

- Fear of war is down considerably, but fear of national disunity is rising fast.

2. The American Youth Public

- Their identity, like contemporary history, is fluid and indeterminate.

- They identify with their own generational movement rather than with cross-generational organizations, institutions and ideologies.

- They conscientiously seek to meet others with an open and trusting manner.

- They want to be sexually and expressively free.

- They think in terms of inclusiveness, which allows them to empathetically identify with aliens, the poor people and other nations.

- They oppose the "worship" of technology.

- They seek new participatory forms of organization.

- They favor discovery and exploration of over academism.

3. The Perspectives of Blacks and Racial Minorities

From a QOL/public policy standpoint, the misunderstandings of history make the problem more severe. Although it is true that ethnic and racial groups other than Blacks began in the slums of our cities, four significant differences exist:

- Color (you can change your name but not your color)

- Earlier immigrants to the shores of America had crafts and skills that were needed.

- There is no longer great opportunity in moving West in the great migrations.

- There is the effect on psychological motivation of the heritage of working as slaves.

Policy/decision makers may well assess their knowledge of the categorical groups, such as:

- Races
- Ethnic groups
- Religious groups
- Sex oriented groups
- Special interest groups
- Physical
- Geographical
- Economic
- Cultural
- Educational
- Age

A key to measuring and planning for QOL in a pluralistic society is for the planner/decision maker to be cognizant of unique values of minority populations. Social unrest which affects the QOL of the nation is rooted in the QOL of the nation's constituent minority groups.

The QOL of each life style involves considerations related to four factor areas: the social, the economic, the psychological, and the environmental. No public planning, no decision making should be attempted without first taking into consideration the varying values of the different life styles.

Quality of Life Indicators

Another study published by the Environmental Protection Agency "Quality of Life Indicators in U. S. Metropolitan Areas, 1970--A

Comprehensive Assessment," lays the groundwork for numerical evaluation.[10]

The physical inputs of the overall quality of life consist of five principal goal areas or QOL components. They are defined in broad terms, and cover most major concerns of all individuals.

1. Economic Component;
2. Political Component;
3. Environmental Component;
4. Health and Education Component; and
5. Social Component.

These concerns have been chosen with a view to developing a concept of well-being as broad and common as possible. Psychological inputs are not included because they are not amenable to quantification. The five goal areas encompass command over private goods and services being produced and consumed, and, in addition, the public counterparts not provided at market prices or consumed on an individual basis. The physical input factors selected in this study have the following characteristics:

1. They should be sufficiently universal so that the fundamental principles would generally be agreed upon by, and apply to, the majority of people in the metropolitan areas today; they should be of great present and potential interest to all levels of government as essential elements of well-being.
2. They should be commonly understood and should have policy objectives which can be realistically and efficiently implemented.
3. They should be flexible enough to account for any variations in lifestyle over space and time, and should be easily adaptable to changes in social, economic, political, and environmental conditions in a dynamic society.
4. They should be open to verification according to

recognized scientific approaches and should be capable of being updated with new data so that comparisons can be made over time.

The number of variables selected under the five goal areas total more than 120. Insofar as possible, they are formulated in a way as to show both the concerns of the individual and the well-being of the community. The interdependent relationship among variables is also recognized; the same variable may appear simultaneously in two different goal areas, and yet the independent objective among the five principal goals is fundamentally unaffected.

The variables selected for the study are shown in the figures in Appendix B. The sign on the left of each variable indicates the effect of the variable on the quality of life--the positive or negative contribution to the input measurement.

The components are evaluated using data supplied by the 1970 U. S. Census. A QOL finding for each component is established and an overall QOL rating given for each of the selected Standard Metropolitan Statistical Areas (SMSA).

The Quality of Life Concepts and the evaluation system are the areas in which the minerals industries can find the values and systems by which the industries themselves will be judged in the future. The basis of an effective public relations program can be founded on the concepts of Qualify of Life that are measured by the systems used by the Environmental Protection Agency.

"What Mining Means to Americans," (Appendix F) is a publication of the American Mining Congress that suggests, "Our horn of plenty starts with a hole in the ground." The first sentence states, "Most people pass their days with no thought of the role mining plays in their

lives." The addition of quality of life concepts to these statements would enlarge the scope of their impact. If the booklet were enlarged to include quality of life examples of mining and the general public, this author suggests that it would be more effective in communicating the story of mining to those more liberal law makers and the people who support them.

CONCLUSIONS

The reputation of mining as a good corporate citizen has been challenged. Mining has traditionally had low visibility; the result has been that few people have thought of the role that mining plays in their lives or in the quality of their lives.

The public relations of mining has focused on material benefits from a hole in the ground. The area of life quality as a result of mining has not been pursued. This study has suggested that quality of life is a valid and established concept that can be incorporated into the existing public relations programs. This addition would contribute to the programs to increase the range of the publics to be reached; those liberal, populist, humanistic members of Congress and the people that support them.

This author strongly agrees with the statement that our horn of plenty starts with a hole in the ground and we are in trouble if we forget that. But, there is more. Quality of life describes the interest of many people who have turned away from the traditional values. They want more than an accumulation of wealth--they want a sense of well being that is based on quality, not quantity. If mining wishes to reach these people, then mining needs to assess its role in terms of its audience and gear its responses accordingly.

The issues of land withdrawals and environmental regulation have caused major concern in the mineral industries. The public relations programs have developed to win the support of the people show the concern. The programs are only directed to a limited audience and they need to be expanded to include a larger part of the population.

The possible region of operation in Figure 1 can be expanded through public relations work.

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APPENDICES

APPENDIX A

CURRENT AFFAIRS

The trend of current affairs in public sentiments and federal legislation certainly presents some very challenging areas for survival of a basic supplier of raw materials. These challenges must be kept as such; should they become discouraged, this would constitute a submittal of control to outside forces. The industry necessarily must assess the impact of public sentiment and federal legislation to determine its role in the future production of raw materials. It can assume a subservient position and bow to the wishes of external pressures, or the industry can assess its value in a leadership role and set the goals for production, environmental enhancement, and safety standards. Clearly, the industry must regulate itself, or it will be regulated beyond its control.

Gilbert E. Dwyer,[5] Kennecott Copper Corporation, feels that the industry is being inundated by a tide of change, which flows across the entire society. Change, born of dissatisfaction, raises a growing concern about the inadequacy of all institutions, not just business.

One factor underlying the momentum of change is the searing experience of the Vietnam War. It called into profound doubt our moral purpose. Our much vaunted technology was brutally employed for war, but it could not produce peace. Military and civilian leaders teased us with false promises of early victory. The credibility of government crumbled. Our national psyche was aroused to grave suspicion about institutional claims to authority and responsibility. These suspicions

will not be allayed with ease.

Disillusionment grew in another way, the failed expectations of affluence. We declared a war on poverty, but the poor are still among us. Progress has failed to keep pace with expectations. Our institutions, public and private, promised more than they delivered.

The 1960's inaugurated a searching inquiry into personal and national values. Education turned into the biggest single industry in the land while millions of kids continued to drop out of high school. The suburban dream became a reality for millions, but the countryside was swallowed up and the environment was fouled up and the dream began to sour. We had more cars than ever, but the traffic jams grew horrendously. We had more possessions, but we dwelt in the daily fear of crime. Paychecks grew along side of complaints about occupational monotony. Ambitious managers found that a title on the door did not put satisfaction in the soul. We encouraged a new generation to become active in politics. The government said we couldn't trust the reporting of the media, while the media reported more and more chicanery on the part of government. Parents with time and money to devote to their children couldn't protect them from epidemic drug addiction. We talked about the work ethic, but we saw the welfare roles explode. Families with time to spend together, spent it in argument over the conflicting life styles of the generations.

The richest society in the history of the world began to question the uses of wealth. Economic growth, as such, ceased to be a relentless national commitment. In the 19th Century, our task had been to populate and develop the continent. Our consuming goal was achieved. In the first half of the 20th Century, we kept up the momentum in order

to create a comfortable material life for all. In the boom years of the sixties, the great majority of Americans had achieved that goal as well. Many of us discovered, as we'd always been told but may have preferred not to believe, that money couldn't buy happiness.

The focus has shifted from piling up quantities of things to creating a quality of life. People want a physical environment that is congenial to man: cities that are livable and viable, open spaces that give enjoyment and enchant the senses, air that is healthy to breathe. They want a social environment that encourages diversity instead of enforcing conformity. They want work that dignifies the individual, giving him room to grow in many dimensions. They want a social order which is both just and stable. They want insitutions that do not misuse power, companies that deal fairly with the consumer and governments that deal justly with citizens. They want blatant inequities removed from a society which professes a devotion to fairness. They don't want another governmental or economic system. They know our system has worked and that other systems have not worked well and they want this system to work better. These wants and ideals don't differ much from those of the mining industry itself. But, how do those outside the industry view the situation?

A speaker at the Bureau of Land Management hearing chose the occasion to describe the environmentalist view of mineral activity. He praised the latest regulations as a means to protect natural resources and correct the adverse effects on the environment. His reaction to the added regulation is one of non-support because they are not strong enough to prevent further damage by "Robber Barons." He further states that only the miner receives free land and free minerals, while asking

for no regulation. He strongly feels this is a form of welfare, and pictures the industry as being "on the government dole." Multiple use concept is opposed by mining, he says, by using public lands for private mineral extraction. His contention is that mining is still in the 19th Century, under the Mining Law of 1872, and can only be brought into the 20th Century by regulation.

The Secretary of Interior, Cecil Andrus, got a standing ovation for his speech to the National Wildlife Federation in which he promised that a "rape, ruin and run" public lands management policy is "a thing of the past."[2] He intends to "end what I see as the domination of the department by mining, oil and other special interests." He stated that President Carter has "canceled the blank check" of the special interests that would hurt the environment in the name of progress. Business as usual has been put out of business.

The environmentalist advocates take a harsh view of the minerals industries' activities. A more moderate view is expressed in an editorial in the April 9, 1977, Reno Evening Gazette that may be closer to that of the public. The editor[12] recalls "Andrus' Hard Words."

He states, "Secretary of Interior Cecil Andrus was a long way out of line recently in stating that the era of 'rape, ruin and run' in the mining industry is going to come to a close.

"His apparent point that unnecessary environmental damage is insupportable was well taken, but he should have avoided such an inflammatory, irresponsible way of making it. It is fair to say that there have been instances of rape, ruin and run in the past, as was true of most national resources, but to imply that this is the general rule is not fair. In two centuries, the mining industry has disturbed only a

fraction of one percent of the land area of the United States. Even here in Nevada, one of the most heavily-mined states in the nation, it is difficult to find bona fide examples of rape and ruin.

"The largest diggings in the state are the open pit copper mines. Close, they look impressively large, but from a short distance they appear insignificant in the vast landscape of Nevada.

"Nor does everyone consider them as unsightly. They've become tourist attractions, as have the huge tailing piles at Virginia City. Should anyone attempt to remove those tailing piles from the Comstock Lode, we'd suspect there'd be trouble from the environmentalists.

"Far more conspicuous, ugly samples of environmental damage are apparent in highway projects. The new Kingsbury Grade is a good one. Why, then, is the mining industry singled out for excoriation?

"In California, there've been genuine examples of rape and ruin by the gold dredges. That's true, too, of the Eastern coal country where large areas have been laid waste by strip mining. That day is long past. These days, the few dredges operating must reclaim the land, as must the strip mining operations. In fact, the only substantial unrepaired damage done by the strip miners occurred during the 1940's, largely when wartime demands led to excesses on many fronts.

"The rip-and-tear attitude of pioneer days has settled down. Most mining firms would not rape and ruin if they were of a mind to. They fear public opinion and government regulation too much.

"There are still some problems. Under the old mining laws, mining claims require at least $100 worth of assessment work every year. A few miners might still carve the landscape with bulldozers for no other reason than to satisfy the law.

"The Forest Service and Bureau of Land Management are well justified in demanding better mine road-building practices and reclamation of mined land where it is feasible. But, on the whole, there is paltry evidence to support the secretary's claim. He has done the industry and the country a disservice. The nation deserves better of the secretary. As chief administrator for most of the public lands, his responsibilities are enormous. He is a key man in forging our minerals policies, among other things, with huge impact on the public interest.

"In fact, the Mining and Minerals Policy Act passed by the Congress in 1970 requires that the secretary help assure a healthy minerals industry, but this and other statements indicate that Andrus is unaware of this law. Should he discourage the industry, the country may expect trouble ahead. Like agriculture, mining is a basic industry. Without farming, people don't eat. Without mining, they don't drive cars, plug in appliances, use the many material conveniences on which our standard of living is based.

"Men of industry rightly say that without minerals humanity would have to return to the cave.

"With that in mind, loose, rhetorical words by the secretary are deeply hurtful. He should choose them more carefully."

Another view concerns the "Public Image of the Extractive Industry." It was published in the Denver Post. The author, Steve Wynkoop[17] of Stanford Earth Sciences Industrial Associates, comments on the public image, or reputation of the industry, and some of the background.

"Over the past few years I have observed a quiet revolution in Colorado. For decades the exploitation and management of natural

resources in Colorado had been the cornerstone of the state's economy. The public and the state's public officials were acutely aware of this fact. Growth in the extractive industries was applauded. People were sympathetic to the mining industry and its efforts to extract gold, silver, lead, zinc, molybdenum and coal in Colorado. It meant jobs and it meant wealth. Few stumbling blocks were erected in the paths of mining companies and independent prospectors seeking to find mineral wealth and exploit it. That has all changed, of course. And, it seems to me that it changed in response to several factors. The first I would cite would be the urbanization of Colorado. The second would be diversification of Colorado's economy. And the third would be the national environmental movement--a movement that has won numerous adherents in Colorado. I cannot cite any surveys or polls, but, I think the electorate in Colorado has clearly shown it distrusts the extractive industry. Rep. Wayne Aspinall and Senator Gordon Allott were both defeated for office after campaigns in which they were pictured as being "owned" by mining interests. The electorate's refusal to fund the 1976 Winter Olympic Games in Colorado was a clear anti-growth statement. The election of Dick Lammvas Governor of Colorado was a victory for those seeking more government control over the development of the state's natural resources. When Senator Gary Hart defeated incumbent Senator Peter Dominick, it was at least partly because few believed in Dominick's portrayal of himself as an environmentalist. This, I would say as an aside, despite the Senator's fine record in support of Colorado Wilderness Areas. The voters in Colorado last fall also decided they would reserve for themselves any decision on whether nuclear explosives may be used in the state to recover natural resources. Prospective

developers of Colorado gas fields who plan to use nuclear explosives, such as in the Project Rulison and Project Rio Blanco experiments, will have to petition to get their project on the ballot and then win approval from the voters before proceeding. That is the mood of the Colorado voter. It is, I am sure you will agree, a far cry from the attitude that prevailed only a few years ago.

"How did this shift in public opinion come about? I would like to submit that it came about for two reasons. First, the mineral industry did not--and has not yet--dealt in a constructive manner with shifts in public opinion. Secondly, an increasingly urbanized population has found itself estranged from the development of basic resources necessary for the maintenance of a high-technology society.

"For the past five years, I have worked in close proximity with various persons in the mineral industry. These have included political and press relations representatives of this industry, operating personnel and executives, attorneys specializing in mineral law and educators at the Colorado School of Mines. It has been my observation that some of these people have been locked into a view of the mineral industry that is quite outdated. The view has several components. First, man needs minerals. Second, minerals in economically exploitable deposits are where you find them. Third, mineral resources are so valuable to society that their exploitation must proceed regardless of damage to other resources. It is difficult to challenge the first two components of this view unless we are willing to return to the stone age. But, there is a tone of arrogance, of contempt for other values in the presumption that the need for mineral resources development is overriding. People who have worked hard to buy a couple of acres in

the Rockies to build a retirement dream home aren't likely to agree there is a need for a strip mine that would spoil their view. Those who appreciate the same area for its wildlife production features would take a similar view. The nearby metropolis that uses the land as watershed won't want it disrupted. These views, including the views of the prospective mineral developer, become advocacy positions in a public debate. You've seen such disputes arise time and again. As they have arisen, you have seen the mineral industry get bloodied in the fray. Sometimes, such objections as I cited above prevail. Other times, they are used as levers to gain more public control over private mineral development. The point that I would like to make here is that it is typical of the mineral industry to start out with a hard-line advocacy view representing that vision of itself I mentioned earlier. It draws a line early in the game from which there is no compromise and then finds itself being bludgeoned into accepting government control of its development. It finds itself being zoned, restricted and managed. Often, people I talk to in the mineral industry have no explanation for this phenomenon. Many blame it on creeping socialism. Others blame environmental activists. I believe the mineral industry itself by its unwillingness to compromise brings on a lot of its own troubles.

"This analysis is open to easy attack. I know it. You know it. The bigger mining companies are serious about their social and environmental responsibilities. In my own state, Amax is doing an exemplary job with the Henderson Project. But, the analysis does represent a view common to the companies and independent operators at the economic margins. They can't afford to be Amax. In that regard, it is their views that the public finds representing the mineral industry.

Why? Because the mining associations that represent the industry and lobby for it represent the lowest common denominator in the mining industry. The mining associations seek to create a climate in which the most marginal of their members can remain in business. As a result, the outdated views held by some in the mineral industry form the basis of the industry's communciations with the public. And, the public is presented situation after situation where the mining associations are fighting against reforms that have already been adopted as standard practice by the bigger companies. This creates a credibility problem and is the foundation for my earlier assertion that the mineral industry has not dealt in a constructive manner with shifts in public opinion. When people hear enough of this crying wolf, they begin to distrust what the mineral industry tells them. I think they do distrust what the mineral industry tells them.

"My second point deals with my view of how urban man thinks of the products he uses in his everyday life. I expressed this to Professor Kruger in class by posing the question, 'What has titanium ever done for me?' I think the public has lost sight of the two premises I mentioned earlier--man needs minerals and minerals are where you find them. In our high-technology society we tend, I think to believe that if something runs out or becomes too costly, we find a substitute. I suggested in class that, perhaps an institutional advertising campaign could increase awareness of the utility of the minerals industry."

APPENDIX B

Panel 1. FACTORS IN ECONOMIC COMPONENT

(After Liu, 1975)[10]

Factor Effect and Weight	Factors
	I. Individual Economic Well-Being
+ (.25)	A. Personal income per capita ($)
	B. Wealth
+ (.05)	1. Savings per capita ($)
+ (.05)	2. Ratio of total property income to total personal income
+ (.05)	3. Percent of owner-occupied housing units
+ (.05)	4. Percent of households with one or more automobiles
+ (.05)	5. Median value, owner-occupied, single family housing units ($1,000)
	II. Community Economic Health
+ (.07)	A. Percent of families with income above poverty level
- (.07)	B. Degree of economic concentration, absolute value
	C. Productivity ($1,000)
+ (.014)	1. Value added per worker in manufacturing
+ (.014)	2. Value of construction per worker
+ (.014)	3. Sales per employee in retail trade
+ (.014)	4. Sales per employee in wholesale trade
+ (.014)	5. Sales per employee in selected services
+ (.07)	D. Total bank deposits per capita ($)
	E. Income inequality index
- (.035)	1. Central city and suburban income distribution
- (.035)	2. Percent of families with incomes below poverty level or greater than $15,000
- (.07)	F. Unemployment rate
+ (.07)	G. Number of full-time Chamber of Commerce employees per 100,000 population

Panel 2. FACTORS IN POLITICAL COMPONENT

(After Liu, 1975)[10]

Factor Effect and Weight	Factors
	I. Individual Activities
	A. Informed citizenry
+ (.083)	1. Local Sunday newspaper circulation per 1,000 population
+ (.083)	2. Percent of occupied housing units with TV available
+ (.083)	3. Local radio stations per 1,000 population
+ (.25)	B. Political activity participation-ratio of Presidential vote cast to voting age population
	II. Local Government Factors
	A. Professionalism
+ (.02)	1. Average monthly earnings of full-time teachers ($)
+ (.02)	2. Average monthly earnings of other full-time employees ($)
+ (.02)	3. Entrance salary of patrolmen ($)
+ (.02)	4. Entrance salary of firemen ($)
+ (.02)	5. Total municipal employment per 1,000 population
+ (.02)	6. Police protection employment per 1,000 population
+ (.02)	7. Fire protection employment per 1,000 population
+ (.02)	8. Insured unemployment rates under state, federal, and ex-servicemen's programs
	B. Performance
- (.03)	1. Violent crime rate per 100,000 population
- (.03)	2. Property crime rate per 100,000 population
+ (.03)	3. Local government revenue per capita
+ (.03)	4. Percent of revenue from federal government
+ (.03)	5. Community health index
+ (.03)	6. Community education index

C. Welfare assistance

+ (.053) 1. Percapita local government expenditures on public welfare ($)
+ (.053) 2. Average monthly retiree benefits ($)
+ (.053) 3. Average monthly payments to families with dependent children ($)

Panel 3. FACTORS IN ENVIRONMENTAL COMPONENT

(After Liu, 1975)[10]

Factor Effect and Weight	Factors
	I. Individual and Institutional Environment
	A. Air pollution index
- (.05)	1. Mean level for total suspended particulates (ug/m^3)
- (.05)	2. Mean level for sulfur dioxide (ug/m^3)
	B. Visual pollution
- (.033)	1. Mean annual inversion frequency
- (.033)	2. Percent of housing units dilapidated
+ (.033)	3. Acres of parks and recreational areas per 1,000 population
	C. Noise
- (.033)	1. Population density in the central city of the SMSA, persons per square mile
- (.033)	2. Motor vehicle registrations per 1,000 population
- (.033)	3. Motorcycle registrations per 1,000 population
- (.10)	D. Tons of solid waste generated by manufacturing per million dollars value added
- (.10)	E. Water pollution index
	II. Natural Environment
	A. Climatological data
- (.05)	1. Mean annual inversion frequency
+ (.05)	2. Possible annual sunshine days
- (.05)	3. Number of days with thunderstorms occurring
- (.05)	4. Number of days with temperature of 90^o and above
- (.05)	5. Number of days with temperature of 32^o and above
	B. Recreation areas and facilities
+ (.125)	1. Acres of parks and recreational areas per 1,000 population
+ (.125)	2. Miles of trails per 100,000 population

Panel 4. FACTORS IN HEALTH AND EDUCATION COMPONENT

(After Liu, 1975)[10]

Factor Effect and Weight	Factors
	I. Individual Conditions
	A. Health
- (.125)	1. Infant mortality rate per 1,000 live births
- (.125)	2. Death rate per 1,000 population
	B. Education
+ (.063)	1. Median school years completed by persons 25 years old and over
+ (.063)	2. Percent of persons 25 years and over, who completed 4 years of high school or more
- (.063)	3. Percent of males ages 16 to 21 who are not high school graduates
+ (.063)	4. Percent of population ages 3 to 34 enrolled in schools
	II. Community Conditions
	A. Medical care availability and accessibility
+ (.05)	1. Number of dentists per 100,000 population
+ (.05)	2. Number of hospital beds per 100,000 population
+ (.05)	3. Hospital occupancy rates
+ (.05)	4. Number of physicians per 100,000 population
+ (.05)	5. Per capita local government expenditures on health
	B. Educational attainment
+ (.125)	1. Per capita local government expenditures on education
+ (.125)	2. Percent of persons 25 years old and over who completed 4 years of college or more

Panel 5. FACTORS IN SOCIAL COMPONENT

(After Liu, 1975)[10]

Factor Effect and Weight	Factors
	I. Individual Development
	A. Existing opportunity for self-support
+ (.018)	1. Labor force participation rate
+ (.018)	2. Percent of labor force employed
+ (.018)	3. Mean income per family member ($)
+ (.018)	4. Percent of children under 18 years living with both parents
- (.018)	5. Percent of married couples without own household
+ (.018)	6. Individual education index
	B. Promoting maximum development of individual capabilities
+ (.028)	1. Per capita local government expenditures on education ($)
+ (.028)	2. Percent of persons 25 years old and over who completed 4 years of high school or more
	3. Persons ages 16 to 64 with less than 15 years of school but with vocational training
+ (.014)	a. Percent of males
+ (.014)	b. Percent of females
+ (.028)	4. Individual health index
	C. Widening opportunity for individual choice
	1. Mobility
+ (.007)	a. Motor vehicle registrations per 1,000 population
+ (.007)	b. Motorcycle registrations per 1,000 population
+ (.007)	c. Percent of households with one or more automobiles
	2. Information
+ (.007)	a. Local Sunday newspaper circulation per 1000 population
+ (.007)	b. Percent of occupied housing units with TV available
+ (.007)	c. Local radio stations per 1,000 population

3. Spatial extension

- (.011) a. Population density in SMSA, persons per square mile
- (.011) b. Percent of population under 5 and 65+ living in central city

+ (.022) 4. Individual equality index

+ (.022) 5. Individual and institutional environment index

II. Individual Equality

A. Race

+ (.028) 1. Ratio of Negro to total persons median family income adjusted for education
+ (.028) 2. Ratio of Negro to total persons in professional employment adjusted for education
- (.028) 3. Ratio of Negro males to total males unemployment rate adjusted for education, absolute value
- (.028) 4. Ratio of Negro females to total females unemployment rate adjusted for education, absolute value

B. Sex

- (.055) 1. Ratio of male to female unemployment rate adjusted for education, absolute value
- (.055) 2. Ratio of male to female professional employment adjusted for education, absolute value

C. Spatial

- (.037) 1. Percent working outside county of residence
- (.037) 2. Income inequality index--central city and suburban income distribution, absolute value
- (.037) 3. Housing segregation index, absolute value

III. Community Living Conditions

A. General conditions

+ (.016) 1. Percent of families with income above poverty level
+ (.016) 2. Percent of occupied housing units with plumbing facilities
- (.016) 3. Percent of occupied housing units with 1.01 or more persons per room
+ (.016) 4. Percent of occupied housing units with a telephone available

+ (.016) 5. Percent of workers who use public transportation to work
- (.016) 6. Total crime rate per 100,000 population
- (.016) 7. Cost of living index

B. Facilities

1. Recreational facilities

+ (.005) a. Number of swimming pools per 100,000 population
+ (.005) b. Number of camping sites per 100,000 population
+ (.005) c. Number of tennis courts per 100,000 population
+ (.005) d. Miles of trails per 100,000 population

+ (.018) 2. Number of banks and savings and loan associations per 1,000 population
+ (.018) 3. Number of retail trade establishments per 1,000 population
+ (.018) 4. Number of selected service establishments per 1,000 population
+ (.018) 5. Number of hospital beds per 100,000 population
+ (.018) 6. Volumes of books in the main public library per 1,000 population

C. Other social conditions

- (.018) 1. Death rate per 1,000 population
- (.018) 2. Birth rate per 1,000 population
+ (.018) 3. Sports events in the metropolitan area
4. Cultural events in the metropolitan area

+ (.007) a. Dance, drama, and music events
+ (.007) b. Cultural institutions
+ (.007) c. Fairs and festivals held

+ (.018) 5. Community health and education index
+ (.018) 6. Natural environment index

APPENDIX C

A SUMMARY OF EXISTING PUBLIC RELATIONS PROGRAMS IN THE MINING INDUSTRY

I. COMMUNICATIONS EXCHANGE

A. Sponsored by American Mining Congress

Jim Murphy
Director of Communications Activities
American Mining Congress
1100 Ring Building
Washington, D. C. 20036
(202)331-8900

Bulletin relays details of the many different communications programs and ideas being used or developed in the mining and related resources industries.

II. Intelligent Choice

A. Sponsored by Caterpillar Tractor Company

Booklet focuses on energy shortages, material and mineral depletion, transportation systems, environmental issues, and other vital topics facing the American public.

Main theme: "There are no simple solutions--only intelligent choices."

III. PEP Talk

A. Sponsored by Kennecott Copper Co., Utah Copper Division

Productive Employees Prosper (PEP) is a taped television-like news show that informs employees of company developments.

IV. Do's and Don'ts for Company Film Makers

A. Sponsored by Business Week

Report offers do's and don'ts for company film makers.

V. Say it with Flowers

A. Sponsored by Arch Minerals

A packet of flower seeds is presented by the company to

visitors of Arch Farms, the reclamation and conservation subsidiary of the Arch Minerals Company.

VI. Scholarships

A. One program is sponsored by U. S. Steel in Minnesota. It is an essay contest with prizes for the annual winners. The program has been running for 18 years.

VII. Mining Report, Mining: Work Horse of the Arizona Economy

A. Published by the Bureau of Business Administration, Arizona State University, in Arizona Business Magazine.

VIII. Survey Results: Newspaper Ads are Less Annoying

A. Sponsored by American Association of Advertising Agencies. Newspaper ads are most favorable, followed by magazine ads, radio, television, billboards and direct mail.

IX. Spencer Squirrel

A. Sponsored by Conoco, Spencer Squirrel is Conoco's spokesman in a booklet aimed at children. Its objective is to educate children about the different forms of energy, their origins and uses.

X. Telephone Update

A. Sponsored by Bunker Hill Company, Kellogg, Idaho. A two minute telephone message with updates on company developments, local government moves, and so forth.

XI. IMA Shows and Tells

A. Sponsored by the Idaho Mining Association. A chart that explains Idaho's major mineral products.

XII. Homestake Sage began in 1876

A. Sponsored by Homestake Mining Company. A booklet that describes the mine from the very early history to the present date.

XIII. What Mining Means to Americans

A. Sponsored by the American Mining Congress. A booklet that asserts that the United States is becoming dangerously dependent of foreign sources for many key minerals. It is intended for quick and non-technical reading.

XIV. America in a Word

A. Sponsored by Phillips Petroleum Company. A series of five one-half hour films, each examining our economic heritage from a different viewpoint; "Land," "People," "Innovation," "Organization," and "Government."

XV. Total Course

A. Sponsored by the Colorado Mining Association. A course of instruction is designed especially for secondary school teachers, counselors and administrators on a total concept of the mining industry.

XVI. Colorado Mining Industry--The Facts

A. Sponsored by the Colorado Mining Association. A fact book on Colorado's mining industry that presents both facts and issues.

XVII. Honest Exchange

A. Sponsored by the Wyoming Mining Association. A film, Mining and our Environment, is available for showing by service clubs, schools, and others.

XVIII. Mining A to Z

A. Sponsored by Minnesota Mining Association. A pocket size booklet that portrays the development of iron mining in the state, entitled Minnesota's Iron Mining Industry.

XIX. Henderson Togetherness

A. Sponsored by Amax, Inc. A brochure describing Amax Climax Molybdenum Company's efforts to determine the proper balance among the components representing the quality of life.

XX. In the Middle

A. Sponsored by the Resource Education Foundation. A publication that presents the middle view between preservation and exploitation. Frank Dunkle is executive director.

XXI. "It Takes"

A. Sponsored by Asarco. A series of ads to acquaint the public with the company's mining activities.

XXII. Texasgulf Trilogy

A. Sponsored by Texasgulf. Three educational films produced with Colorado School of Mines. They are "The Earth People,"

"Son of Wildcat," and "Major Miner." The presentation is directed at high school students to encourage them to consider natural resources as a career.

XXIII. Talking Pictures

A. Sponsored by Consolidation Coal Company. A series of booklets that break down facts into tight statements, with illustrations, to tell their story.

XXIV. Asarco: The Metal Maker

A. Sponsored by Asarco. A brochure that outlines the interests of Asarco. The publication represents mining and what it is attempting to do.

XXV. Western States' Mining Public Relations Workshop

A. Sponsored by The Western States' Mining Associations
Hosted by Idaho Mining Association, 1975
Colorado Mining Association, 1976

The purpose is to stimulate the interchange of public relations ideas and practices between the mining associations in the western states and their members. The sessions are designed to better equip the mining public relations man to deal with the current issues before the industry.

1. Public Relations and Politics

   a. Ballot Issues

2. Public Relations and National Issues

   a. "Legitimizing the Mining Industry"

3. Public Relations and the Media

   a. Getting through to the media in a competitive uptight world.

4. Media Roundtable

   a. Open discussion on mining industry with a panel of professionals representing the various types of media.

XXVI. Summary of State Association Activities

A. Aggregates and Concrete Association of Northern California, Inc.

B. American Mining Congress - Communications Program

C. Arizona Mining Association

D. California Mine Operator's Association

E. Colorado Mining Association

F. Idaho Mining Association

G. Mining Industry Council of Missouri

H. Montana Mining Association

I. Montana Coal Council

J. Nevada Mining Association

K. New Mexico Mining Association

L. Northwest Mining Association

M. Southern California Rock Products Association

N. Utah Mining Association

O. Wyoming Mining Association

Author's Note:

Each association has contributed to public relations from a particular viewpoint. The American Mining Congress Communications Program has approached public relations from a national scope. AMC is collecting and distributing methods and literature from successful programs to mining people and associations requesting assistance.

APPENDIX D

LAND WITHDRAWALS

(From U. S. Department of the Interior)[14]

Vast areas of the United States, totaling about one-third of the nation's land mass, are owned by the federal government. Most of these federal lands are in the 11 states of the Far West and Alaska, where the topography and varied geology have concentrated a natural storehouse of mineral wealth.

More than 90 percent of the country's copper production and 80 percent of the silver production come from just five western states. Twenty of the 25 largest metal mines in the country are in the Far West. Montana, Wyoming, and other western states have vast reserves of coal. These western states plus Alaska are likely to continue to be the major domestic source of many metals and minerals. The state of Alaska, in particular, because of its immense size, varied geology, and unexplored areas could prove to be this country's major hope for increasing the domestic production of important metals and minerals.

The large amount of land in these important mineral-producing states that has not passed into private ownership gives the federal government a great deal of impact upon the future of mineral production in this country. How the federal government allows or restricts mineral exploration and development on these lands will be a major determinant of the future level of domestic mineral production.

The United States' demand for minerals can be satisfied from two sources, domestic production (including recycling) and imports. There are two major benefits to the nation from producing minerals from domestic resources rather than importing them. First, if domestic

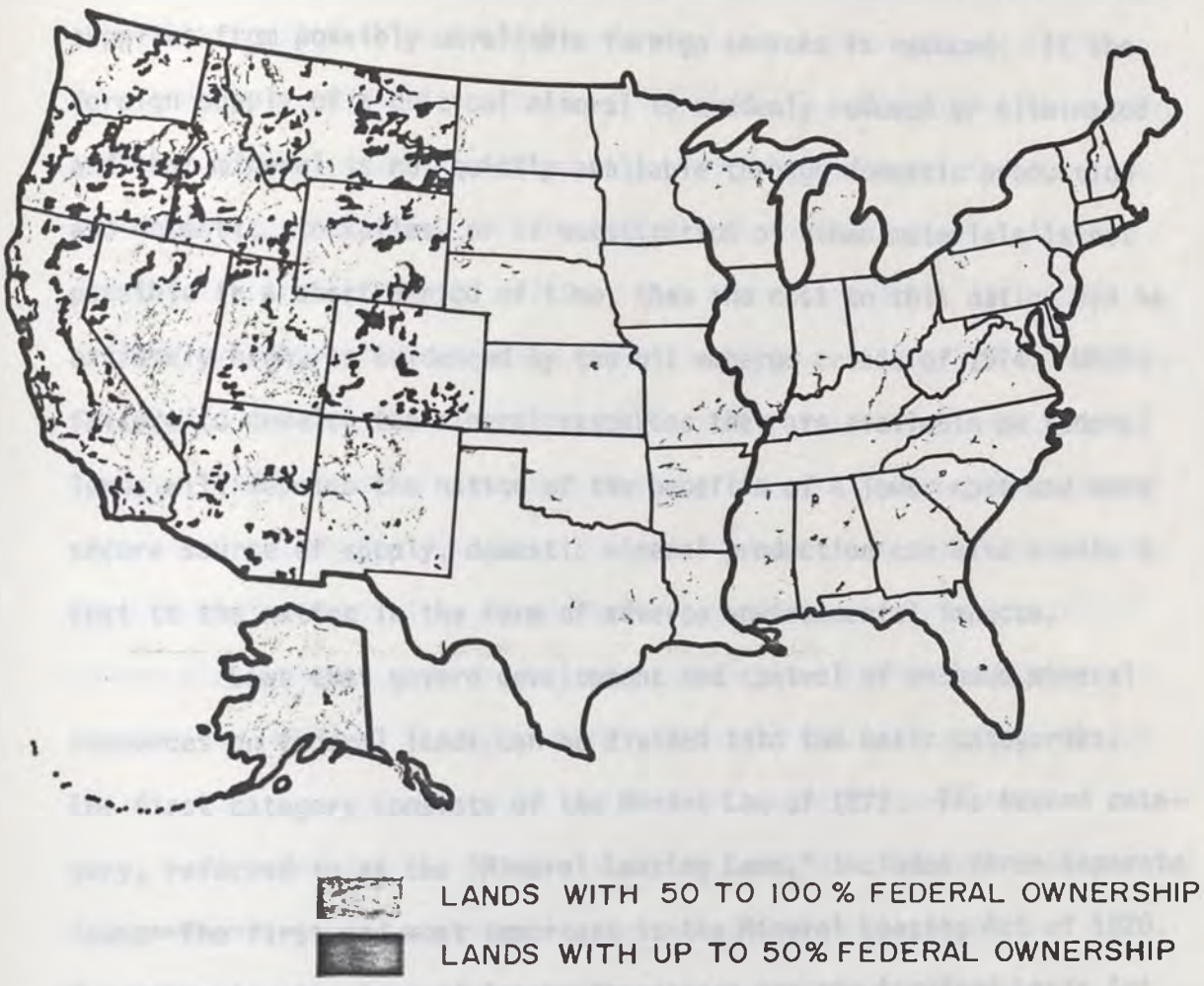

Figure 2. FEDERAL OWNERSHIP OF LANDS
(U. S. Department of the Interior, 1976)[14]

production is cheaper, there is a net benefit to the country equal to the difference between the cost of producing the mineral domestically and the world price for the imported mineral. Second, our reliance on supplies from possibly unreliable foreign sources is reduced. If the foreign supply of a critical mineral is suddenly reduced or eliminated and that mineral is not quickly available through domestic production and domestic stockpiles, or if substitution of other materials is not possible in a short period of time, then the cost to this nation can be extremely high, as evidenced by the oil embargo crisis of 1974. While failure to develop the mineral resources that are available on federal lands will deprive the nation of the benefits of a lower cost and more secure source of supply, domestic mineral production can also create a cost to the nation in the form of adverse environmental impacts.

Laws that govern development and control of onshore mineral resources on federal lands can be divided into two basic categories. The first category consists of the Mining Law of 1872. The second category, referred to as the "Mineral Leasing Laws," includes three separate laws. The first and most important is the Mineral Leasing Act of 1920. Two other leasing laws of lesser importance are the Acquired Lands Act of 1947, which regulates mineral disposal on all lands that have been acquired by the federal government and which incorporates most features of the 1920 act; and the Geothermal Steam Act of 1970, which regulates the disposition of geothermal steam. Laws that govern mineral resources on the Outer Continental Shelf and common variety minerals used mostly for construction purposes make up the last grouping.

The Mining Law of 1872 was a product of the social and economic conditions in the middle of the Nineteenth Century. The federal

government's policy in this era was to transfer lands from the public domain to private ownership as quickly as possible to satisfy a variety of needs; thus, the Homestead Act of 1862 made public lands easily available to farmers who showed a serious intent to engage in agriculture and thus settle the empty lands of the West. Similarly, the Mining Law of 1872 makes public lands easily available to miners who can show that the land contains a valuable mineral deposit and who can demonstrate a serious intent to develop these minerals. If an individual makes a discovery of a valuable mineral on some portion of the open federal lands and undertakes at least $100 worth of labor or improvements per year at the site of the discovery, he can establish a possessory right to the area (called a mining claim) for the purpose of developing and extracting minerals. After fulfilling additional requirements, a mining claimant can obtain a patent, a legal process that ordinarily conveys the whole of the government's title to the land covered by the claim. Such conveyance passes the land into private ownership.

The Mining Law applies in only 19 states. In these states, public domain lands and those lands where the mineral estate (but not the surface rights) have been reserved for the federal government totaled 734 million acres in 1974. This is approximately 33 percent of the total land area of the United States. Since 1872, various acts of Congress and Executive actions have withdrawn a large portion of these lands from the jurisdiction of the Mining Law. The Mining Law never applied to public lands in the other 31 states (approximately 1.8 million acres) or to those lands which were once in private ownership but subsequently were acquired by the federal government. These acquired lands total approximately 56.3 million acres, or about 2.5 percent of

the total land area of the United States. The Mining Law applies to all minerals with the exception of oil, gas, coal, phosphate, sodium, oil shale, sulfur, potash, and certain other hydrocarbons--all of which are subject to the Mineral Leasing Act of 1920--and common varieties of sand, stone, pumice, and cinders, which are subject to the Material Act.

In general, the Mining Law of 1872 has served the nation well over the more than 100 years of its existence. The legal framework of the Mining Law has provided a sound basis for protecting the rights of those who would explore for the minerals under its coverage. In so doing, the Mining Law of 1872 has contributed greatly to the legal and economic atmosphere required to support the domestic development of the metals and minerals so important to the economy throughout the years.

On the other hand, the Mining Law of 1872 does not reflect some of the goals of the nation that have developed during the past 100 years. For example, it makes no specific provisions to protect the environment or to preserve the land for other uses that may be of greater value than the minerals. Moreover, the United States does not receive direct compensation for the minerals disposed of under the Mining Law.

Mineral Leasing Laws

In 1920, in response to concerns that the Mining Law was inadequate, a number of important and widely occurring minerals were removed from the jurisdiction of the Mining Law and were placed under the Mineral Leasing Act. In all of the 50 states, the three Mineral Leasing Laws apply to public domain lands, acquired lands (lands once in private ownership), and lands where the mineral estate has been reserved

for the federal government. These lands total 809 million acres, or 36 percent of the total land area of the United States. The Leasing Laws themselves, other subsequent statutes, and Executive actions have excluded various portions of these lands from the Mineral Leasing Laws.

The Mineral Leasing Laws introduced two changes in the management of mineral resources on federal lands that were not found in the 1872 Mining Law. First, they provided for mineral leases. In those areas where valuable minerals are known to exist, the right to develop these minerals is given to the high bidder under a competitive bidding process. The lessee is required to reimburse the government for the right to develop the minerals in the form of bonus bids, rents, royalties, or other payments. Note that only the right to develop the minerals is given to the lessees. The ownership of the land remains with the government.

In other areas, the Mineral Leasing Act provides for the issuance of prospecting permits for a 2-year period with a preference right to a lease if a valuable mineral deposit is discovered. In comparable situations for oil and gas, noncompetitive leases were authorized. These represent the noncompetitive leasing provision of the Mineral Leasing Laws. It is important to note that the agencies that administer the surface have a great deal more discretionary authority to allow or prohibit mineral development under the Leasing Laws than under the 1872 Mining Law. Also, the United States receives rentals and royalties under these leases.

The second change is that the Secretary of the Interior was given authority to issue regulations and impose restrictions on mining activities on federal lands for those minerals covered by the Mineral

Leasing Act in order to protect the general interest of the United States.

Administrative Responsibility

The federal agency with primary responsibility for administering the Mining and Leasing Laws is the Bureau of Land Management (BLM) in the Department of Interior (DOI). The BLM grants patents to mining claims, leases all lands under the Mineral Leasing Laws, and prepares public land orders (for the signature of the Secretary) that officially withdraw land from the Mining and Mineral Leasing Laws. Many of these activities, including record keeping, are carried out by local and state BLM offices. For example, to find out if a particular area is open to location of a mining claim under the 1872 Mining Law, one must consult the records in BLM's state or district office and the local county recorder's office and, in many cases, undertake a ground search for mining claim monuments and markets. Within DOI, the Geological Survey (USGS) also has important responsibilities for the administration of the Mineral Leasing Laws. The USGS classifies public lands according to their mineral character and value for water power and storage purposes and evaluates mineral tracts subject to competitive lease. The USGS also supervises operations incident to the prospecting, development, and production of minerals on federal lands that are under lease or covered by prospecting permits.

The other federal agencies that administer the surface activities on federal lands also have a great deal of influence over the operation of the Mining and Mineral Leasing Laws on these lands. Some of the more important surface administration agencies, in addition to BLM,

include (1) the Forest Service, (2) the Department of Defense, (3) the Fish and Wildlife Service, (4) the National Park Service, (5) the Bureau of Reclamation, (6) the Nuclear Regulatory Commission (formerly the Atomic Energy Commission), (7) the Federal Power Commission, and (8) the Bureau of Indian Affairs. Land is not normally leased under the Mineral Leasing Laws without the approval of the surface managing agency. Mineral exploration and development under either the 1872 Mining Law or the Leasing Laws can be severely restricted by an agency's control over access to the site or over the surface activities necessary to the exploration and development of a mineral resource.

Limitations and Restrictions on Mineral Exploration and Development

In the 104 years since the passage of the 1872 Mining Law and the 56 years since the Leasing Act, numerous congressional acts and executive policies have placed restrictions on the availability of federal lands for mineral exploration and development. An attempt has been made to classify all federal lands according to their degree of availability for mineral exploration and development. The classification is difficult because of the large number of statutes, executive policies, and government agencies involved and because of the lack of any previous data or studies on the subject. The results of this effort must be considered tentative and preliminary, but they do give an overall view of the restrictions that have been placed on mineral exploration and development on federal lands.

Because of the different nature of the two categories of mineral laws, the results of the study are shown separately for those

minerals covered by the 1872 Mining Law (Table 2) and those covered by the Leasing Laws (Table 3). As can be seen from the tables, all federal lands have been divided into approximately 30 to 40 categories. These categories are based either on the surface managing agency or the congressional statute or executive policy that set aside these lands for special uses. These land categories are in turn placed in four classifications according to their degree of availability for mineral exploration and development. These classifications are entitled "formally prohibited," "severely restricted," "moderately restricted," and "slight or no restrictions." (Further description of each term can be found in the Mining and Minerals Policy, 1976 Bicentennial Edition.)[14]

The restrictions on mineral development have greatly increased in recent years. In 1968 mineral development was formally prohibited or severely restricted on less than 20 percent of federal lands. Today the figure is over 50 percent. The large increase has come about for two primary reasons. The first is the enactment of the Alaska Native Claims Settlement Act of 1971 (ANCSA), and the second is an increased interest in preserving large tracts of land as wilderness.

Though practically all categories of land withdrawals have increased in recent years, the largest land withdrawal in history is attributable to a single act of Congress, ANCSA. When Alaska entered the Union in 1959, less than two-tenths of one percent of Alaska was in private ownership. The Statehood Act declared that the state was entitled to 105 million acres. The ANCSA is a complicated Act designed to provide "a fair and just settlement of all claims by natives and native groups of Alaska based on Aboriginal land claims." A second goal is to incorporate large areas of the state into new parks, scenic rivers,

Table 2. RESTRICTED LANDS UNDER MINING LAW OF 1872

(After U. S. Department of the Interior, 1976)[14]

Classification of Federal lands according to limitations and restrictions that prohibit or discourage mineral exploration and development under the Mining Law 1974 data.

Degree of Availability	Category No.	Category Description	Acres (millions)	Percent of Total
Formally Prohibited	A1	National parks and monuments	14.6	2.0
	A2	Naval petroleum and oil shale reserves	23.9	3.3
	A3	Military (other than naval reserves)	17.4	2.4
	A4	Indian purpose lands (not reservations)	4.2	.6
	A5	Wild and scenic reivers (wild category only)	.5	.1
	A6	Reclamation and national reclamation areas	5.7	.8
	A7	Atomic Energy Commission	1.4	.2
	A8	Small tracts and recreation and public purposes	.5	.1
	A9	Administration and recreation areas (Forest Service and Bureau of Land Management)	1.9	.3
	A10	Utility corridor (Alaska)	2.9	.4
	A11	Oil shale	3.7	.5
	A12	Wildlife refuges	18.6	2.5
	A13	Alaska Native Claims Settlement Act (ANCSA)-native selections	120.0	16.3
	A14	ANCSA - D2/four systems	80.0	10.9
	A15	Bureau of Land Management primitive and natural areas	.4	.1
	A16	Proposed withdrawals	2.6	.4
	A17	Miscellaneous	6.5	.9
	A18	Classification and Multiple Use Act	.7	.1
		Subtotal	305.5	41.9
	A19	Application for Alaskan State selections	55.5	7.6
	A20	Wilderness areas	10.7	1.5

Degree of Availability	Category No.	Description	Acres (millions)	Percent of Total
Severely Restricted	A21	ANCSA- D1 lands (open for metalliferous only)	46.0	6.3
	A22	Utility corridor (open for metalliferous only)	2.5	.3
	A23	Proposed wilderness (primitive areas - Forest Service)	3.8	.5
		Subtotal	118.5	16.2
	A24	National trails	.1	-----
Moderately Restricted	A25	National parks and monuments	5.1	.7
	A26	Power site withdrawals	15.2	2.1
	A27	Forest Service roadless areas (wilderness review)	55.9	7.6
		Subtotal	76.3	10.4
	A28	Leased areas (some overlap)	73.8	10.0
Slight or No Restrictions	A29	Bureau of Land Management wilderness review areas	24.7	3.4
	A30	Stock driveways	2.5	.3
	A31	Tentatively approved Alaskan State selections	13.0	1.8
	A32	Other	119.6	16.3
		Subtotal	233.6	31.8
		GRAND TOTAL	733.9	100.0

Table 3. RESTRICTED LANDS UNDER MINERAL LEASING LAWS
(After U. S. Department of the Interior, 1976)[14]

Classification of Federal lands according to limitations and restrictions that prohibit or discourage mineral exploration and development under the Mineral Leasing Laws, 1974.

Degree of Availability	Category No.	Category Description	Acres (millions)	Percent of Total
Formally Prohibited	B1	National parks and monuments	24.6	3.0
	B2	Naval petroleum and oil shale reserves	23.9	2.9
	B3	Military (other than naval reserves)	10.6	1.3
	B4	Atomic Energy Commission acquired lands	.7	.1
	B5	Wild and scenic rivers (wild category only)	.5	.1
	B6	Utility corridor	5.4	.7
	B7	ANCSA - native selections	120.0	14.8
	B8	ANCSA - D2/four systems	80.0	9.9
	B9	ANCSA - D1 lands	46.0	5.7
	B10	Petroleum reserve buffer zone (lower 48 only)	.1	-----
	B11	Wildlife refuges (acquired lands and special reserve)	.7	.1
		Subtotal	312.5	38.6
	B12	Wildlife refuges (prohibited for oil and gas except drainage)	23.4	2.9
Severely Restricted	B13	Application for Alaskan State selections	55.5	6.9
	B14	Wilderness areas	11.6	1.4
	B15	Oil shale (prohibited for sodium)	3.7	.5
	B16	Proposed wilderness (primitive areas - Forest Service)	3.8	.5
	B17	National trails	.1	-----
	B18	Miscellaneous	5.5	.7
	B19	Military (other than naval reserves)	6.8	.8
	B20	Indian purpose lands (not reservations)	4.2	.5
	B21	Atomic Energy Commission lands	.7	.1
	B22	Administration and recreation	1.9	.2
	B23	Reclamation and national recreation areas	5.7	.7

Degree of Availability	Category No.	Description	Acres (millions)	Percent of Total
	B24	Small tract and recreation and public purposes	.5	.1
	B25	Bureau of Land Management primitive and natural areas	.4	.1
	B26	Classification and Multiple Use Act	.7	.1
	B27	Proposed withdrawals	2.6	.3
	B28	Forest Service roadless areas (wilderness review)	55.9	6.9
		Subtotal	183.0	22.7
	B29	Tennessee Valley Authority (acquired lands)	0.9	0.1
Moderately Restricted	B30	Power site withdrawals	15.2	1.9
	B31	Bureau of Land Management wilderness review areas	24.7	3.0
	B32	Tentatively approved Alaskan State selections	13.0	1.6
		Subtotal	53.8	6.6
	B33	Leased areas (some overlap)	73.8	9.1
Slight or No Restriction	B34	Indian purposes (acquired lands, not reservations)	.8	.1
	B35	Remainder subject to agency planning	185.1	22.9
		Subtotal	259.7	32.1
		GRAND TOTAL	809.0	100.0

refuges, and forests, and in other ways to plan the future land use of the state. Until the land use decisions for the state are finally determined, actions taken pursuant to the act severely restrict mineral exploration and development on 60 to 70 percent of the acreage in the state, in addition to large areas where mineral development was previously restricted. Some of this land will eventually be made available for mineral exploration and development. For example, lands owned by the Indians or the state government, or some federal lands not set aside for other uses, such as parks, refuges, and wilderness areas will be available. The fact remains, however, that for the present and for an undetermined number of years to come, most of our largest state (also the state with the greatest untapped mineral potential) is not open to mineral exploration and development.

Another act of Congress that will eventually close millions of acres of federal land to mineral exploration and development is the 1964 Wilderness Act, which established a national wilderness preservation system. On January 1, 1984, Forest Service lands designated as wilderness areas by the Wilderness Act will be withdrawn from the Mining and Leasing Laws, although they are theoretically available for exploration and development until that date. Although mineral activity is not formally prohibited in these areas for the next four years, the restrictions on surface activities necessary for exploration are so severe and the risk of not perfecting a discovery before 1984 are so high that these lands are not attractive for the investment of exploratory risk capital. It is also very likely that any lease applications would be rejected by the agencies administering these lands, even though these lands have not been formally withdrawn from the Leasing Laws.

Other restricted areas are Forest Service primitive areas and roadless areas, and BLM wilderness review areas. The proposed power site areas are theoretically available for mineral exploration and development under both the 1872 Mining Law and the Leasing Laws. However, these areas have been designated as possible hydroelectric power sites. It is the government's policy that a dam may be built at any time at these sites that would flood a large portion of the area. Any damage to mining activities underway in these areas would not be compensated for by the federal government.

Policy Problems

Congressional acts and executive policies that prohibit or severely restrict mineral exploration and development on large areas of federal land raise difficult policy problems and issues. In deciding to adopt such laws or policies, a decisionmaker in government must weigh the advantages or benefits to the nation against the disadvantages or costs of that policy or action. However, it is almost impossible to determine accurately the advantages of allowing mineral development in any specific area. Over the history of man's use of minerals, minerals that were once thought to be useless have now become valuable. Uranium is a recent example. Deposits of minerals that were once completely uneconomical to mine have now become economical because of new mining technology or changing economic conditions; such as low-grade copper deposits. Similarly, areas that were thought to have little or no mineral potential have become important, as the revival of interest in mineral deposits in southeast Missouri. Though our ability to evaluate the mineral potential of a specific area has increased greatly, it is

still very difficult to say with any degree of certainty that a particular area does or does not have significant mineral potential.

Congress did attempt to solve this assessment problem through the Wilderness Act by requiring the Bureau of Mines and USGS to evaluate the mineral values present in those areas to be included in the National Forest Service Wilderness System, but not in those wilderness areas within national parks and monuments. Resource appraisals of areas proposed for inclusion in the National Wilderness Preservation System are made through a program of geologic mapping and geochemical and geophysical surveys. This information constitutes a data base that is interpreted and evaluated by an interdisciplinary scientific team to determine the resource potential of metals, non-metals, coal, oil and gas, and geothermal energy.

Three factors may lead decisionmakers in the Congress or the Executive to prefer devoting large areas of the public domain to a single use or to a limited range of uses rather than allowing a wide range of compatible uses including mineral exploration and development. In the past, mining laws and regulations gave very little discretionary authority to those who manage the public lands. Land was either open to entry under the Mining Law with almost no restrictions, or closed to all types of entry under all conditions. Government policy has often taken one or the other extreme position with no compromise possible. Administering agencies should have sufficient flexibility to assure that mining proceeds in an environmentally acceptable manner. Forest Service regulations which limit and control certain types of activities on Forest Service lands are a good example of needed flexibility.

The second factor is that there seems to be a widespread

belief that mining is or must be destructive to the environment and, consequently, is incompatible with most other uses of the federal lands. The term "mining," however, is broad and covers a wide range of techniques and methods. Some mining techniques have had significant environmental impacts, but others have not. To consider mining as a single type of land use that is either totally allowed with no restrictions or totally prohibited is a serious error.

The third factor is that much of the information necessary for Congress or the Executive to make sound decisions on land use is not available. The most obvious gap in the federal government's information-gathering system is the lack of a comprehensive accounting of those policies and actions which prohibit or severely discourage mineral exploration and development on federal lands. Because this information is not available and because responsibility for administering the federal lands is spread over so many different agencies, government decision-makers are prone to policies that restrict mineral exploration and development on various, relatively small tracts of land without having an appreciation of the cumulative extent of all the restrictions on mineral exploration and development that exists on federal lands.

APPENDIX E

ENVIRONMENTAL REGULATION

(From U. S. Department of the Interior)[14]

Environmental Legislation

The growth of public concern for the environment during the past ten years has resulted in an increase in the amount of environmental legislation and in the number of applications of existing statutes to environmental purposes. The passage of the National Environmental Policy Act (NEPA), the Federal Water Pollution Control Act, the Clean Air Act, the Endangered Species Act, the Solid Waste Disposal Act, the Safe Drinking Water Act, and the Federal Noise Pollution Control Act covered most of the specific aspects of the interaction of society's activities with its environment. Other legislation includes The Coastal Zone Management Act of 1972, The Ocean Dumping Act, The Marine Protection, Research and Sanctuaries Act of 1972, The Federal Insecticide, Fungicide and Rodenticide Act, The Energy Supply and Environmental Coordination Act of 1974, The Toxic Substances Control Act, and The Resources Conservation and Recovery Act of 1976. For example, the development of the northern Great Plains coal to the satisfaction of NEPA would include consideration of: assessment of air pollution potentials, possible withdrawn federal lands, endangered or threatened species, population distribution, traffic problems, historical and archeological land marks and monuments, agriculture, reclamation, and economics.

The impact on industry of these laws covers the total cycle of activity from project planning through operations and restoration of mining and milling sites. For example: project planning is modified to

include specific requirements of the laws; costs of compliance may increase in terms of productivity, unit costs, and production; capital costs may increase as pollution control devices are required on mills and smelters; some operations may close; others may modify processing procedures; penalties may be assessed for violation of various regulations; lands may be withdrawn from mining exploration and development. Although the impacts differ from operation to operation, they generally lead to higher costs to the company.

In addition to the federal legislation, individual states have passed their own mining and environmental statutes. Some state laws pose absolute restrictions upon types of mining activity, or severely limit activities; other state laws parallel federal environmental legislation. State mining and environmental laws are complex and numerous and are sometimes more restrictive than federal acts; for example, the noise pollution regulations of Illinois have been applied to restrict coal-mining operations in that state, and the Pennsylvania Clean Streams Law has required extensive pollution control from coal mine operations within that state.

State rules and regulations also carry out federal legislation. One company is alleged in a court action to have committed violations of the Clean Air Act through discharge of airborne asbestiform fibers, and violations of the Federal Water Pollution Control Act by discharge of waste products into an interstate waterway. Standards for the effluent were those set up by the state authority to satisfy the federal legislation.

Regions and local governments also have additional restrictions and ordinances, while numerous applications of common law affect

mining operations. Regional groups acting in response to such federal legislation as the Coastal Zone Management Act, groups created to study and control specific problems such as the Appalachian Regional Commission, and those developed as local autonomous governmental units, such as the American Indian Tribal governments, have developed rules and regulations of their own for mining or land use within their territorial boundaries. Such regional regulation may run the gamut from planning, study, and data base coordination, as done by the Appalachian Commission, to the drafting of the specific site-oriented legislation, as is being considered by the Navajo Tribal Council.

It becomes readily apparent that legislation, rules, and regulations applicable to environmental concerns present the developer of a potential mineral deposit with multiple requirements. Complying with these requirements presents unparalleled challenges for the mining companies to develop workable solutions.

The variety of solutions to environmental concerns is only hinted at when it is realized that due regard for the environment takes into account types of materials, stages of use, environmental media (air, water, land), sources and effects. Although many reactions have occurred that range from outright opposition to willing acceptance of the new situation, explicit attention is being given to environmental management at every stage of the mineral cycle, from pre-exploration through reuse.

Costs and Compliance

Some estimated costs of compliance with environmental legislation are listed in Table 4. The Council on Environmental Quality estimates that the overall cost to industry, spread out over the next

decade, will be less than 5 percent of total investment. Recently, a United Nations committee estimated that the cost of abating all the world's pollution due to mining industry sources by the year 2000 would be high in actual dollars ($200 Billion plus or minus), but low as a percentage of the wealth recovered (1 to 2 percent). At times, however, specific industries have had to expend a significant percentage of their capital investment in pollution control equipment. In 1971-1974, for example, the non-ferrous mining industry spent over 20 percent of its capital investment in compliance with environmental regulations. Accurate estimates are difficult to make because steps taken to reduce pollution frequently result in plant modernization, including non-polluting processes and increased production capacity.

The complexities and difficulties of measuring some benefits and costs are recognized, but the principles of benefit-cost studies offer a systematic analysis useful to many levels of decisionmaking. These problems need not delay adoption of the approach, but they do suggest that research to improve the benefit-cost analysis techniques will pay off in better knowledge of the consequences of proposed governmental legislation and regulation before enactment or implementation.

Industrial Progress Toward Compliance

As a direct result of environmental legislation and concern, progress has been made in recent years toward cleaning up the environment. The remedies for preventing or repairing environmental damage take one of several forms: (1) reduction of emissions, (2) improved protection of the landscape and ecosystems, (3) repair of the landscape and ecosystem that has been damaged, (4) optimum site selection of

unavoidable damage, and (5) concentration and safe disposal or storage.

In the mining industry specifically, pollution control devices have been installed on mills and smelters, water pollution has been reduced, solid waste has been treated, and land has been reclaimed. In some existing plants, particularly copper smelters, new metallurgical processes that will meet pollution standards are replacing the older methods of smelting and refining. Industry is also designing and constructing new plants that will have built-in pollution control features.

Other Regulations

A major area of concern is the "time bomb" effect of recent legislation. Specifically, the Resource Conservation and Recovery Act (RCRA) of 1976 gives broad powers to the regulatory agencies that have no economic considerations for the companies. The RCRA sets the precedent for future regulation and its effects are yet to be felt.

Table 4. COSTS OF COMPLIANCE

(After U. S. Department of the Interior, 1976)[14]

Selected fiscal impacts of environmental legislation on the minerals industry.[1]

Title	Impact of Compliance with Regulations (1973 dollars)	
Federal Water Pollution Control Act (FWPCA)	Industrywide Best Practicable Technology	$27.6 billion[2] capital investment or + 1.5% price effect
		$5 billion[2] operating cost per year or + 7.3% price effect
	Best Available Technology	$16.7 billion[2] capital investment or + 0.9% price effect
		$4.4 billion[2] operating cost per year or + 6.3% price effect
Clean Air Act (CAA):		
Cost to Cu industry	$940 million[3]	investment over several years
Cost to Al	$616 million[3]	(21.7 cents per lb) over unstated period
Cost to Fe	$12 billion to $14 billion[4]	over 9 years for both CAA and FWPCA
Surface Mining Regulations (43 C.F.R. 3040)	Rehabilitation (shaping, topsoil management, seeding, refertilization, surface manipulation, drainage control, and mulching) $925 - $2,750 per acre[5]	
National Environmental Policy Act; Coastal Zone Management Act		
Wilderness Act; Endangered Species Act; Solid Waste Act	Opportunity losses, withdrawal of critical areas. Cost of preliminary planning not clearly evaluated.	

[1]Does not include estimated economic benefits to other segments of society.

[2]Estimated by the National Council on Water Quality.

[3]Secretary of Commerce. Third Annual Report to Congress.

[4]Mining Engineer, Vol. 27, No. 7, p. 40

[5]Established by Study Committee on the Potential for Rehabilitating Lands Surface Mined for Coal in the Western U. S., NAS Rehabilitation of Western Coal Lands, Ballinger Publication Co., Cambridge, Mass., 1974.

APPENDIX F

WHAT MINING MEANS TO AMERICANS

What Mining Means to Americans is a booklet published by the American Mining Congress as a public service. AMC was founded in 1897. AMC encompasses (1) companies that produce most of America's metals, coal, industrial and agricultural minerals, (2) corporations that manufacture mining and mineral processing machinery, equipment and supplies, and (3) engineering and contracting firms, as well as banks, that serve the mining industry. The booklet expresses the basic philosophy, the continuing purposes and the enduring commitments of the AMC.

The booklet pictorially and graphically presents the mining story. "We are in trouble if we forget that our horn of plenty starts with a hole in the ground," is one of the opening statements. Mining is further presented as:

1. Keystones of Destiny
2. The Bedrock of Everyday Life
3. The Expanding Demand for Mining
4. Growing Dependence on Foreign Supplies and the Increasing Competition for Mineral Resources
5. Our Heritage of Wealth
6. The Recycling Aspects of Materials
7. Mining and the Preservation of the Environment.

"Never has so little yielded so much to so many," closes the argument for mining in this presentation.

This publication could be taken as one of the better examples of public relations in the mineral industries. It is colorful and it expresses the concerns and purposes of mining. It is also an example of how the public relations in mining has concentrated upon the material benefits to American society.

The concepts of quality of life are not mentioned by the American Mining Congress. This publication is an example where the concepts could be used to expand upon the influence of mining upon the lives of Americans. Qualify of life concepts and measurements are an established study by the United States Environmental Protection Agency. If they were used by the industry to reach a larger audience in society, a solution to expanding the possible region of operation, as outlined in Figure 1, could possibly be furthered.